THE TYPHOON OF VISAYAS, DECEMBER 5-6, 1931

By Rev. MIGUEL SELGA, S. J.

[Weather Bureau, Manila, P. I.]

The afternoon weather map of December 4, 1931, shows an area of low pressure extending over southern Visayas, Mindanao, and Palawan. The rapid drop of the barometer east of Samar early in the morning of December 5, left no doubt but that a typhoon had developed in the eastern sector of the depression and it was fast approaching Samar. Typhoon warnings were sent immediately to all the Provinces and stations likely to be affected, and, on account of the peculiar period of the milling season, to all the sugar centrals of Visayas. The typhoon moved so fast that shortly after noon of December 5, it passed south of and very close to Catbalogan, Samar, where the barometer dropped from 756.91 mm. at 8 a. m. to 734.67 mm. 18 minutes past noon. Government offices at

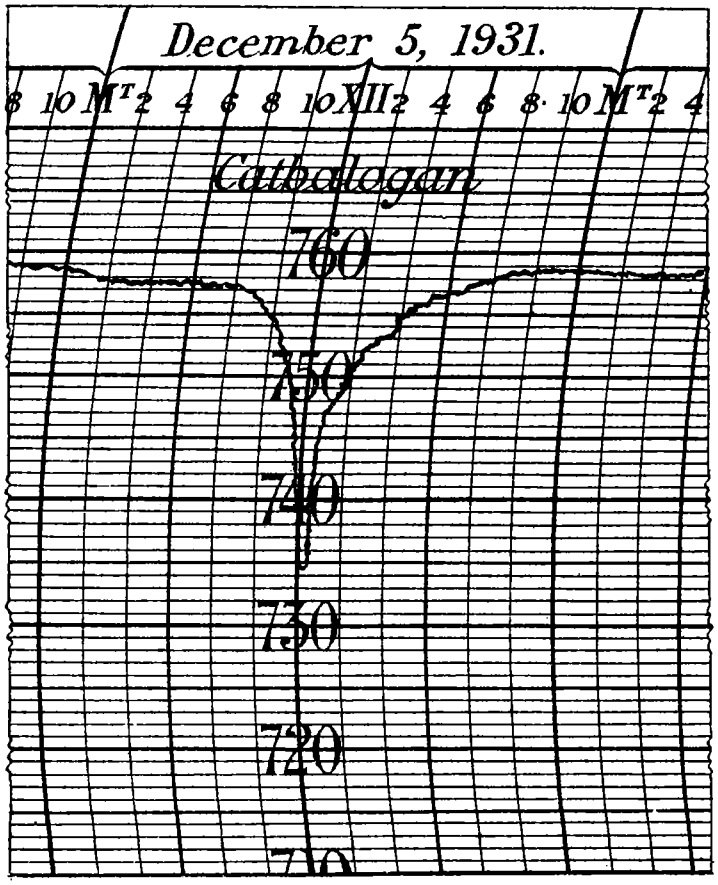


FIGURE 1.—Barogram of the typhoon of December 5, 1931, at Catbalogan, west coast of Samar

Catbalogan were closed at 11 a. m. and the employees sent home to prepare for the storm. The quick dissemination of typhoon warnings by means of the police and the town crier minimized the damages that otherwise would have taken place, yet 28 fish corrals were reported destroyed, over a hundred houses of light materials were damaged, and two persons were found drowned in the barrios of Catbalogan. Taking a west by northwest direction, the typhoon passed north of Capiz at 7 p. m. causing a barometric minimum of 744.66 mm. and southwesterly gusts of force 11. One hour and a half after midnight, the typhoon passed close to and north of the Culion Leper Colony and was located in the China Sea about 130 miles to the westward on the morning weather map of December 6.

The typhoon was treacherous on account of the high velocity of its translation and the narrowness of its diameter. The 530 kilometers that separated Catbalogan from Culion were covered by the typhoon in 13 hours and 15 minutes, giving a velocity of 40 kilometers, or almost 25 miles, per hour.

The narrowness of the storm's diameter is evident from the fact that, * * * although the wind was very strong in the proximity of the center, yet in some places like Culion and southern Mindoro, four hours before and after the barometric minimum the wind was no more than a gentle breeze with clear or partly cloudy sky. The motor boat *Siruma* was washed ashore and completely destroyed on the eastern coast of Sibuyan and the *Virginia*, on the western coast of Busuanga. The barogram from Catbalogan, presented herewith, shows the limited extent, but steepness of gradient, of the typhoon.

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

Table 1 shows the average temperatures for the Caribbean Sea and the Straits of Florida for December of each year from 1919 to 1930, inclusive, and Table 2 summarizes the temperatures for December, 1930, in the same areas. The chart shows the number of observations taken in December, 1930, within each 1° square, and mean temperature data for subdivisions of the area considered.

The surface temperatures of the Straits of Florida fall rapidly during December, but the seasonal downward trend frequently is interrupted by alternations of warmer and cooler quarter-months, especially in the latter part of the month. This fluctuation of mean temperature is a winter condition, and is in contrast with the fairly steady and persistent drop of autumn. By the end of the month, the transition from autumn to winter is well advanced, and normal temperatures characteristic of winter prevail, with the water temperatures usually not far from the normal annual minimum.

During December the season has not progressed so far in the Caribbean, where autumn conditions still persist, as it has in the straits. This month is in the midst of the period of most rapid drop in normal temperature over all parts of the Caribbean Sea, where the winter season of relatively low temperatures, with little or no upward or downward trend, is delayed until late January and lasts until early March.

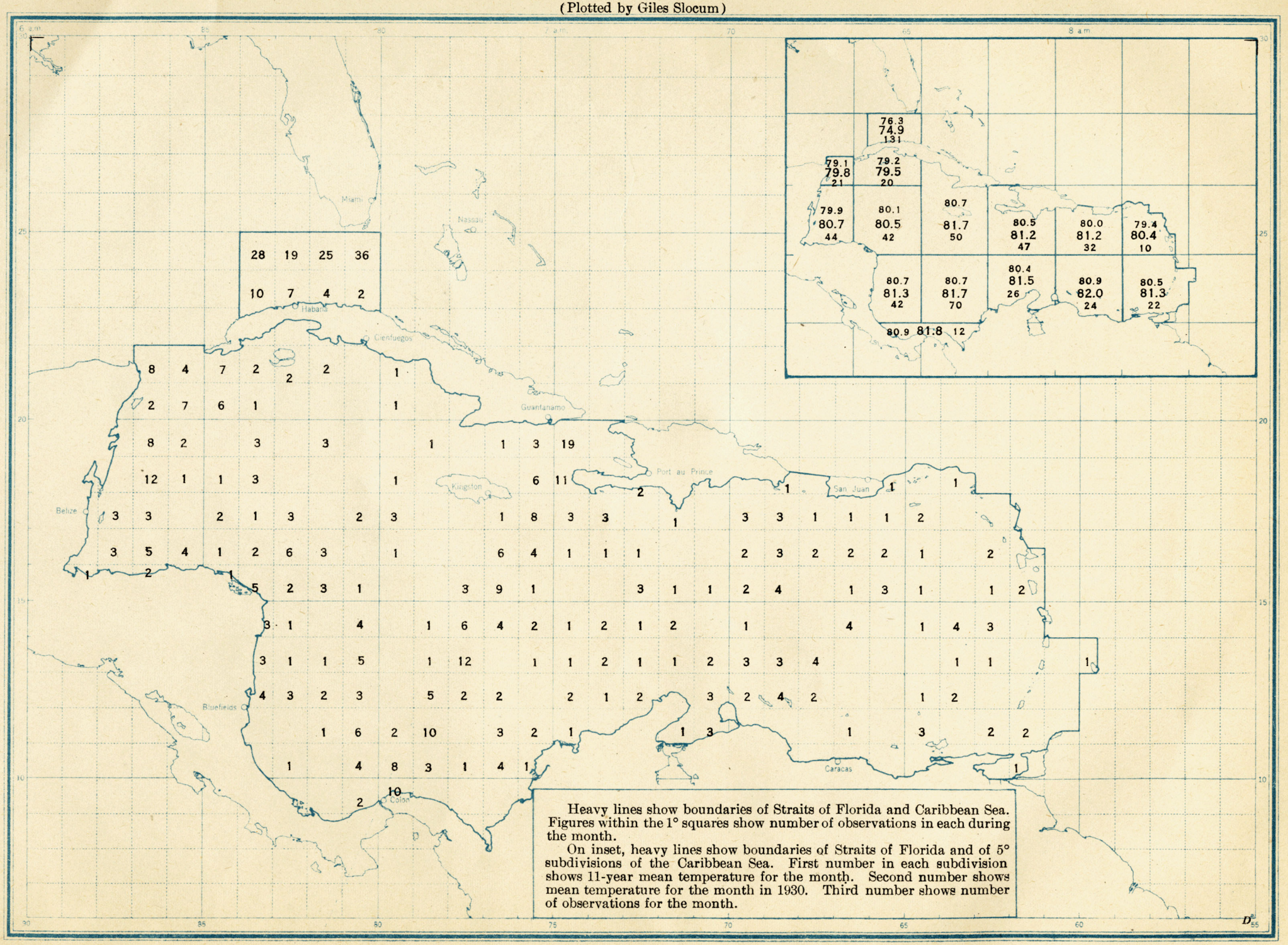
December, 1930, was the warmest December in the Caribbean during the term of years covered (1920–1930) and the coolest in the Straits of Florida. For this month as a whole nearly all parts of the Caribbean were unprecedentedly warm and *all* distinctly above their average temperatures for the 11-year period. The third quarter of this month was relatively the coolest, when the mean temperature of the Caribbean was a trifle below that of the same period in 1926. The other three quarters were record-breaking or record-equaling. In the Straits of Florida, only the first quarter of this month was near the seasonal average. The second, third, and fourth quarters were cooler than the hitherto coolest corresponding periods.

Current charts[1] indicate that the water flowing through the Yucatan Channel between November and January divides into three main branches. The weakest, in the

[1] Cf. Hydrographic Office of the Navy Department of the United States. Pilot Chart of the Central American Waters. Washington, D. C. Published monthly.

Distribution of Greenwich Mean Noon Bucket Observations of Sea-Surface Temperatures, December, 1930

(Plotted by Giles Slocum)



Heavy lines show boundaries of Straits of Florida and Caribbean Sea. Figures within the 1° squares show number of observations in each during the month.

On inset, heavy lines show boundaries of Straits of Florida and of 5° subdivisions of the Caribbean Sea. First number in each subdivision shows 11-year mean temperature for the month. Second number shows mean temperature for the month in 1930. Third number shows number of observations for the month.

sense of the least rapid, makes, as does the main[2] flow in the summer and autumn months, the circuit of the Gulf, around the Sigsbee Deep. The stronger and principal winter branches take a more direct route to the straits. Here, the currents indicated on the Hydrographic Office Charts[1] show that, during the late autumn and early winter, one branch heads almost due north from the Yucatan Channel, and reaches a point about 200 miles south of Mobile Bay, where it turns sharply to the eastward, then south-southeastward into the straits. A second branch flows almost directly from the channel, around northern Cuba and through the straits, joining the first near Alligator Reef, off the extreme southeast Florida coast. Both these currents seem to be rapid enough to cause that surface water from the Yucatan Channel which takes these routes to start passing through the straits by December. Therefore, it is to be expected that the Caribbean will begin, at this time of the year, to show its maximum effect in warming the waters of the straits.

In view of this geographical distribution of currents the conditions in 1930, when the Caribbean was warm throughout the autumn and the straits extremely cool in December, would seem to indicate one or the other of the following alternatives:

(1) That the currents or the conditions affecting the surface temperatures in these regions were in some way abnormal at that time;

(2) That the variations of the surface temperatures of the Caribbean waters do not soon thereafter and directly correspondingly modify the surface temperatures in the straits.

Considerable evidence, which will be discussed at a later time, favors the first of these two alternatives. Hence we may presume that the surface temperatures which obtained late in 1930 in these regions probably were caused by the superposition of some infrequent (though not unprecedented) control or controls upon the continuous influences of the flow from the Caribbean.

During the year 1930 all months except January and February showed temperatures above the 11-year mean in the Caribbean. A run of 10 consecutive months of high temperatures is, however, not an unusual condition in this area. Records show that periods of above average or below average temperature, are likely to last for from one to three or more years.

[1] Cf. Hydrographic Office of the Navy Department of the United States. Pilot Chart of the Central American Waters. Washington, D. C. Published Monthly.
[2] Cf. Bucket Observations of Sea Surface Temperatures. MONTHLY WEATHER REVIEW. Vol. 59 : 211.

The year 1930 may then be summarized as containing the beginning of a more or less extended period of high temperatures in this area and having one record-breaking month. Notwithstanding the exceedingly high temperature of its final month, this year as a whole was not as warm as some others of the preceding decade, being merely an ordinarily warm year.

The mean temperature for 1930 in the Straits of Florida approximated the 11-year average, but June and December of that year were the coolest of these respective months in the 11-year period considered. The principal positive deviations from average temperatures were in the early part of the year. The departures for the last three months were negative.

TABLE 1.—*Mean sea-surface temperatures in the Caribbean Sea and the Straits of Florida for December, 1919–1930*

Year	Carribbean Sea		Straits of Florida	
	Number of observations	Mean (° F.)	Number of observations	Mean (° F.)
1919 [1]	134	80.2	14	76.4
1920	199	80.4	57	76.1
1921	211	79.8	67	76.7
1922	241	79.9	87	77.3
1923	238	79.6	103	76.0
1924	287	80.2	98	75.9
1925	349	80.8	120	76.6
1926	330	80.9	142	77.0
1927	386	80.5	117	76.5
1928	354	80.3	120	76.4
1929	564	80.1	138	76.5
1930	462	81.2	130	74.9
Mean (1920–1930)		80.3		76.3

[1] Not used in computations because of insufficient data available.

TABLE 2.—*Mean sea-surface temperatures* (°F.) *and number of observations, December, 1930*

Quarter	Period	Caribbean Sea				Straits of Florida			
		Number of observations	Mean	Departure from 11-year mean (1920–1930)	Change from preceding month	Number of observations	Mean	Departure from 11-year mean (1920–1930)	Change from preceding month
			° F.	° F.	° F.		° F.	° F.	° F.
I	Dec. 1–7	92	81.7			36	76.7		
II	Dec. 8–15	137	81.4			30	74.6		
III	Dec. 16–23	114	80.8			29	75.2		
IV	Dec. 24–31	119	80.8			35	73.0		
	Month	462	81.2	+0.9	−0.8	130	74.9	−1.4	−3.3